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EXAMINER	
YAARY, MICHAEL D	

ART UNIT	PAPER NUMBER
2193	

NOTIFICATION DATE	DELIVERY MODE
06/20/2011	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/598,283	CHEUNG, KWAN	
	Examiner	Art Unit	
	MICHAEL YAARY	2193	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *31 March 2011*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,3-31 and 33-40* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1, 3-31, and 33-40* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. Claims 1, 3-31, and 33-40 are pending in the application.

Response to Arguments

2. Applicant's arguments filed 03/31/2011 have been fully considered but they are not persuasive.

Applicant argues that Ellis does not mention calculating a linear function of spectral magnitudes as in claim 1. Examiner respectfully disagrees. The limitation, as recited in the instant claim, reads "where the pre-determined function is comprised of either:(i) a linear combination, a quadratic function, a centroid, a variance, or a n-th order moment." Column 4, line 58-column 5, line 10 discloses the frequency band portions and further column 40, lines 49-53 teaches of linear functions applied to the segments. Therefore, the reference reads on the claimed limitation as currently recited.

Applicant argues Ellis does not disclose the limitations as in claim 3. Examiner respectfully disagrees. Column 23, lines 33-37 disclose dividing values of each band by the sum values, thus dividing by values in the corresponding frequency band.

Applicant argues that Ellis does not disclose the limitations of claim 4. Examiner respectfully disagrees. Column 26, line 65-column 27, line 65 disclose the linear combination of assigned values.

Applicant argues Ellis does not disclose the same limitations as in claim 7. Examiner respectfully disagrees as for the response above and the rejection below.

Applicant argues that Ellis does not disclose the limitations of claim 9. Examiner respectfully disagrees. Column 4, lines 58-column 5, line 10 of Ellis discloses frequency band values representing portions of the signal; wherein a first group of values is compared with a second group of values. Applicant argues that Ellis does not teach how to adjust the relative width of the frequency bands so that if the detected signal is a different speed than the stored reference signal, the matching process can still be workable, however; this is not recited in the instant claim.

Applicant argues that Ellis does not disclose sequential time frame nor a first signature...from a predetermined number of spectral magnitude values detected during the time frame...as in claim 14. Examiner respectfully disagrees. Column 11, lines 28-46 teaches communicating with a segment signature ring buffer to store sequential arranged segment signatures for a time interval, thus reading on the claimed limitation.

Applicant argues that Ellis does not disclose the limitations as in claims 20-25. Examiner respectfully disagrees. Column 11, lines 28-68 teach the values of the time frame indices corresponding to matching first signatures are linearly correlated with values of the indices of matching time frames of the detected signal.

Applicant argues that Ellis does not disclose the limitations of claim 27, as in rearranging the signature digits in order to speed up the search algorithm. Examiner respectfully disagrees. Column 16, lines 14-64 teach for at least one column in the first

data array, sorting within the computer memory, the elements of the column in either ascending or descending order.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1-36 are rejected under 35 U.S.C. 102(b) as being anticipated by Ellis et al (hereafter Ellis)(US Pat. 5,436,653).

Ellis was cited in the previous office action dated 10/01/2010.

5. **As to claim 1,** Ellis discloses a method executed by a digital signal processing system of generating a signature associated with a known signal (abstract), the signature comprised of a set of numeric values of at least one element and corresponding to at least one time frame of the signal, such known signal being identified by an identification index and such time frame index (column 1, line 47-column 2, line 3 and column 10, line 58-column 11, line 27), comprising:

Calculating for at least one time frame of the signal a pre-determined number of spectral magnitude values grouped in at least one frequency band of predetermined width (column 24, lines 14-20, bandwidths);

Calculating for each frequency band a numeric value that is equal to a pre-determined function of one or more of the calculated spectral magnitude values grouped with the frequency band (column 4, line 58-column 5, line 10) where the predetermined function is comprised of either (i) a linear combination, (ii) a quadratic function (iii) a centroid, (iv) a variance, or (v) an nth order moment, where n is a pre-determined number (column 40, lines 49-53, linear function);

;Storing the calculated numeric values in a computer database with a reference to their corresponding time frame index and their corresponding identification index (column 4, lines 13-24, database, and column 44, line 60-65).

6. **As to claim 3,** Ellis discloses dividing the function result by the pre-determined number of spectral magnitude values in the corresponding frequency band (column 23, lines 33-37, dividing).

7. **As to claim 4,** Ellis discloses the function is a linear combination where the coefficient of each term of the linear combination is substantially equal to the ordinal index of the spectral magnitude value within the frequency band divided by a predetermined constant (Column 26, line 65-column 7, line 5, linear combination).

8. **As to claim 5,** Ellis discloses the number of predetermined frequency bands is between 10 and 100 (Column 22, lines 43-52, 16 bands).

9. **As to claim 6,** Ellis discloses the frequency band occupy a range of above approximately 0 Hz and approximately equal to or below 4000 Hz (Column 24, lines 14-18, 30 Hz).

10. **As to claim 7,** Ellis discloses the predetermined constant is substantially equal to the sum of the spectral magnitude values in the corresponding frequency band (Column 26, line 65-column 7, line 5).

11. **As to claim 8,** Ellis discloses dividing the function result by the pre-determined number of spectral magnitude values in the corresponding frequency band (column 23, lines 33-37).

12. **As to claim 9,** Ellis discloses where the width of a frequency band is set to be substantially larger than the magnitude of the frequency shift that results from a predetermined maximum amount of variation in the playback speed of the known signal, such shift being measure at one or both of the upper or lower boundary of the frequency band (column 4, line 58-column 5, line 10).

13. **As to claims 10 and 11,** Ellis discloses where the upper boundary of the frequency band is substantially equal to the lower boundary plus a vale equal to the absolute value of the maximum relative playback speed variation, times the lower boundary, times a constant, where the constant ranges between approximately 1 and

100, where the constant is between 10 and 50 (column 4, line 58-column 5, line 10 and column 22, lines 43-59).

14. **As to claims 12 and 13,** Ellis discloses for each frequency band the upper boundary of the frequency band is substantially equal to the value of the lower boundary of the frequency band times the sum of one plus a pre-determined value, where the predetermined value is between 0 and 10 (column 4, line 58-column 5, line 10 and column 22, lines 43-59).

15. **As to claim 14,** Ellis discloses a method executed by a signal processing system for determining whether a portion of a detected signal of a pre-determined number of sequential time frame duration is substantially the same signal as a portion of at least one know signal out of a plurality of known signals (abstract), each portion of the plurality of known signal comprised of a plurality of sequential time frame duration and each time frame of the known signal having an identification index and a time frame index (column 1, line 47-column 2, line 3 and column 10, line 58-column 11, line 27), comprising:

Calculating for at least one of the time frames of at least one of the known signal a first signature comprised of a set of numbers derived from a predetermined number of spectral magnitude values detected during the first time frame (column 4, lines 13-17 and column 11, lines 28-46)

Storing in a computer database each first signature with a reference to its signal identification index and a reference to the approximate location in time of the time frame from substantially the beginning of said known signal (column 11, lines 47-68, database);

Calculating for at least one of the time frames of the detected signal a second signature comprised of a set of numbers derived from a predetermined number of spectral magnitude values detected during the time frame column 4, lines 13-17 and column 11, lines 28-46);

Selecting from the stored set of first signatures those first signatures that in relation to the second signatures meet a predetermined matching criteria, applying a sequencing test to the time indices associated with the set of matching signatures (column 11, lines 28-68 segment matching).

16. **As to claim 15,** Ellis discloses wherein the first signature and second signature is calculated and stored using one of the methods claim 1, claim 2, claim 5, claim 7, claim 9, claim 11 (see claim 1 above).

17. **As to claims 16 and 17,** Ellis discloses calculating a set of absolute differences between each ordinal member of the set of numbers the first signature and each such member's corresponding ordinal member of the set of numbers comprising the second signature; calculating a sum of the absolute values; and determining whether the sum

produces a value less than a pre-determined value and whether the sum is the minimum sum for all the first signatures tested (column 12, lines 4-52 and column 19, lines 45-58).

18. **As to claim 18,** Ellis discloses calculating an error value using one of the group: (i) the approximate vector distance from the first signature to the second signature; (ii) the approximate L-1 norm between the first signature and the second signature; (iii) the approximate maximum difference between any member in the first signature and its corresponding ordinal member in the second signature; (iv) the approximate minimum difference between any member in the first signature and its corresponding ordinal member in the second signature; (v) the approximate average difference between all of the members in the first signature and their corresponding members in the second signature (column 17, lines 22-47).

19. **As to claim 19,** Ellis discloses determining whether the number of first signatures that meet the predetermined matching criteria and have the same identification index is equal to or greater than a number between and including K+1 and 2K+1, where K is evaluated such the 2K+1 is substantially equal to the predetermined number of time frames (column 11, lines 28-68).

20. **As to claim 20,** Ellis discloses determining whether the values of the time frame indices corresponding to matching first signatures with the same identification index

increase substantially monotonically in relation to the values of the time frame indices of the matching time frames of the detected signal (column 4, lines 9-34).

21. **As to claim 21,** Ellis discloses determining whether the values of the time frame indices corresponding to matching first signatures with the same identification index are substantially linearly correlated with the values of the time frame indices of the mathching time frames of the detected signal (column 11, lines 28-68).

22. **As to claim 22,** Ellis discloses calculating an approximate regression analysis between the values of the time frame indices corresponding to matching first signatures with the same identification index and the values of the time frame indices of the matching time frames of the detected signal (column 4, lines 9-34, matching).

23. **As to claim 23,** Ellis discloses where the determination is comprised of a test whether the correlation coefficient is greater than or equal to approximately .5 (column 22, lines 43-59, coefficients).

24. **As to claim 24,** Ellis discloses where the determination is comprised of a test whether the linear slope is within a range from and including approximately 2 to and including approximately 6 (column 22, lines 43-59).

25. **As to claim 25,** Ellis discloses where the time frame indices of the detected signal and a matching known signal are periodically tracked to confirm that in a sequence of at least two time frames, the time frame indices of the detected signal increases approximately in correspondence with the increase in the time frame indices of the matching known signal (column 4, lines 9-34).

26. **As to claim 26,** the claim is rejected for similar reasons as claims 1 and 14 above Ellis further discloses deleting from the data structures those time frame indices and corresponding identification indices where fewer than approximately K+1 entries in the list have the same identification index, where K is calculated such that 2K+1 is equal approximately to the predetermined number of times frames constituting the portion of the detected signal; deleting from the list those time frame indices and identification indices where the time frame indices of the first signature are not confirmed to increase substantially in synchrony with the time frame indices of the detected signal (column 28, line 66-column 29, line 35).

27. **As to claim 27,** Ellis discloses a method executed by a audio signal processing system of searching a database comprised of a set of at least n first signatures with corresponding identification indices and time frame indices, where each first signature represents the frequency components of a known signal during the time frame, the search looking for all first signatures that meet a pre-determined matching criteria with a second signature, where the second signature represents the frequency components of

a detected signal during a time frame (abstract ;column 1, line 47-column 2, line 3 and column 10, line 58-column 11, line 27; and column 11, lines 47-68, database), comprising:

Storing in a computer memory a first array comprised of all of the first signatures, whereby the nth row in the first data array is the set of members of the nth first signature (column 16, lines 14-26, matrix); For at least one column in the first data array, sorting within the computer memory, the elements of the column in either ascending or descending order (column 16, lines 14-64); Storing in computer memory an additional data array where one element in the second data array corresponds to an element in the one column of the first data array; and the value of the one element in the second data array cross-indexes to where the corresponding element in the first data array originated prior to the sorting step (column 16, lines 14-64 determining value); Applying a search using the second signature to find best match between the second signature and the rows of the first data array; recovering the identification index and time frame index of any matching first signature by using the cross-index of the second data array and applying it to the matching row (column 16, lines 14-64, comparing for differences).

28. **As to claim 28,** Ellis discloses the search algorithm is one of binary search, B Tree, linear search, heuristic tree searching, depth first search, breadth first search (column 40, lines 49-53, linear function).

29. **As to claim 29,** the claim is rejected for similar reasons as claim 28 above.

30. **As to claim 30,** Ellis discloses the predetermined calculation is a linear combination of at least two elements of the signature (column 40, lines 49-53, linear function).

31. **As to claim 31,** Ellis discloses the subset has less than five elements of the first signatures (column 12, lines 11-21).

32. **As to claim 33,** Ellis discloses the signal is comprised of programming of unknown identity that has not been found to match any portion of any known signal further comprised of time frames with corresponding signatures comprising:

Creating an arbitrary identifier with an identification index; assigning the identification index to those signatures derived from the signal; replacing the arbitrary identifier with a correct identification when the unknown signal is identified (column 9, 14-54, unknown segments).

33. **As to claim 34,** Ellis discloses replacing the arbitrary identification index in the database with a pre-existing identification index that references valid identification data identifying the signal (column 9, lines 32-55).

34. **As to claims 35 and 36,** Ellis discloses a machine comprising a central processing unit, a digital data transceiver device and a data storage device comprised

of any machine readable media, where the machine readable media contains a computer program that when executed by a machine, performs any one of the methods of claims 1-14 or 16-34; and a machine readable media of any type, which contains data that is a computer program that when executed by a computer, performs any one of the methods of Claims 1-14 or 16-34 (fig. 1 and 2).

35. **As to claim 37,** Ellis discloses the width of each frequency band contains a different number of magnitude values (column 24, lines 14-20).

36. **As to claim 38,** Ellis discloses performing a range search of the stored set of first signatures (column 10, line 58-column 11, line 27).

37. **As to claim 39,** Ellis discloses pre-sorting the stored first signatures; maintaining an index table that maps the inverse of the sorting (column 16, lines 14-64).

38. **As to claim 40,** Ellis discloses the selecting step is comprised of transforming the stored set of first signatures into a one-dimensional space (column 5, lines 25-46).

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MICHAEL YAARY whose telephone number is (571)270-1249. The examiner can normally be reached on Mon-Fri 9 a.m.-5:30 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Lewis Bullock can be reached on 571-272-3759. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/M. Y./
Examiner, Art Unit 2193

/Lewis A. Bullock, Jr./
Supervisory Patent Examiner, Art Unit 2193